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SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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A SCIENCE SERVICE PUBLICATION

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ASTRONAUTICS

"Moons" for Many Nations

Small earth satellites could be launched by other nations not now participating in the satellite race. Money and adequate launching sites are among the chief deterrents.

► ANY NATION in the world with a modern jet air force, the money and the desire could launch a baby satellite.

This is the opinion of American scientists who say there is "no hard trick" to putting a satellite weighing a few pounds into orbit.

Within recent weeks some satellite-have-not countries have indicated that they would like to join the select company of the United States and Russia in this field. Namely, Red China said she would launch satellites and England and Canada are talking seriously of doing the same.

These three nations, with or without help from the U. S. or the U.S.S.R., could in all probability launch their own brand of satellite in a year or two. With help, they might be able to do it sooner.

So could France, West Germany, Switzerland, Sweden, Japan and Australia.

All these nations have had some experience with different types of rockets and propulsion systems. Together with information made available by the United States there appears to be no reason why they could not launch an artificial earth satellite

weighing upwards of five pounds. That is, the American scientists point out, if they wanted to.

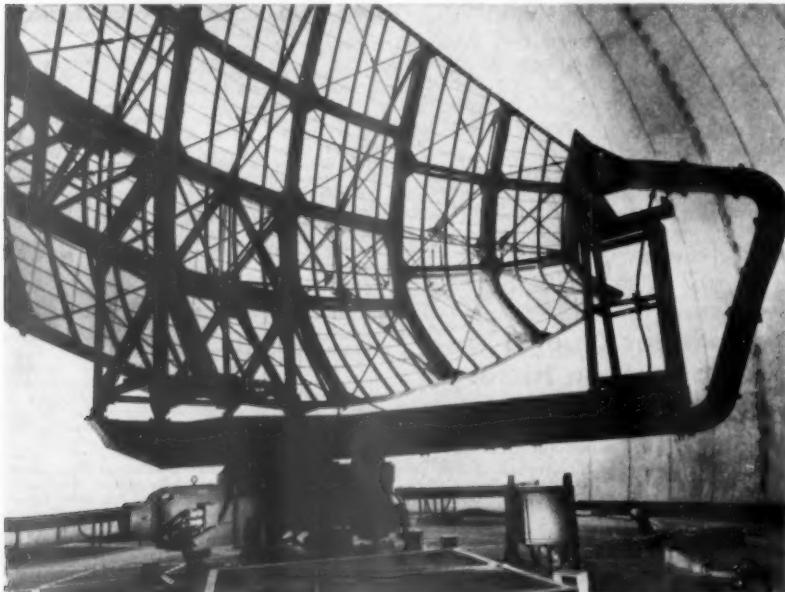
By the same token, almost any nation in the world with jet airplanes could launch a satellite by using a fly-up technique wherein the jet plane substitutes partially for the first stage rocket.

The biggest stumbling blocks for other nations to attempt a satellite launching are money, trained crews, final design work and testing, final hardware development, and testing and launching sites.

Nevertheless, several countries in the world are toying with the idea of launching their own baby moons.

Although Red China, for example, could most certainly launch a satellite with Russian help, there seems to be no reason why she cannot go it alone. Despite the fact that little is known of Red China's rocket developments, it is known that she has highly competent scientists in this area and that Russia has conducted rocket tests in Red China.

England, France and Switzerland, on the



MISSILE MASTER—This advanced long-range search and height-finding surveillance radar, the FPS-33, shown inside the shielded radome, has been installed in the U. S. Army Missile Master system at Fort George G. Meade, Md. A high gain antenna, which increases range coverage by more than 50% is one of the major advancements in the new radar. The new antenna also increases elevation angular coverage reducing the overheat "cone of invisibility." The missile target indicator system provides for increasing target brilliance and decreasing background noise thus helping to reduce operator fatigue.

other hand, have all produced modest-sized liquid propellant rockets. Japanese scientists, starting from scratch, have produced quite significant findings, using their own high altitude rockets. Australia has a suitable launching site.

When tallied up, it becomes evident that the U. S. and the U.S.S.R. may not be the only satellite-have nations in the world for long.

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GEOPHYSICS

U. S. Satellite Scientists Would Invite Others

► THE UNITED States might invite foreign scientists to include their experiments in U. S. satellites.

This might be followed by an invitation to foreign scientists to test any scientific rockets or satellites they may develop in their own countries at U. S. launching sites.

Both possibilities are currently being discussed by U. S. scientists who want to maintain the fine degree of international scientific cooperation built up during the International Geophysical Year. Although the IGY officially comes to an end on Dec. 31, 1958, the U. S. has made it known that it will continue to launch artificial earth satellites.

By offering our own satellites and both our know-how and established launching sites to foreign scientists, the U. S. might provide scientists of other nations with an opportunity they do not now have.

Talk among U. S. scientists on the possibility of extending these invitations to foreign scientists centers around the welcome participation of the top people from abroad.

Such a move on the part of the U. S. would also yield dividends in the form of increased scientific understanding about the world around us, these scientists feel.

At present, few countries in the world have the ready-made facilities to carry out satellite experiments of their own. In addition, few have the trained personnel or the necessary funds to even partially duplicate the U. S. satellite launching set-up.

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ASTRONOMY

Satellite's Radio Signals Scintillate Like Starlight

► THE RADIO signals from U. S. satellites scintillate in the same way that stars twinkle.

An Australian scientist reports on the radio "twinkling" of Explorer I and Vanguard I in *Nature* (June 7).

To confirm that the satellites' radio scintillations were due to effects in the high atmosphere, the twinkling of heavenly sources of radio waves was measured at the same time. "Most of the high values" occurred on the same days, Dr. O. B. Slee of the Radiophysics Laboratory, Commonwealth Scientific and Industrial Research Organization, Sydney, found.

Both fast, irregular fluctuations, identified as scintillations, and an "apparently regular modulation" were recorded as transmitted by the artificial earth satellites.

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PSYCHIATRY

New Shock Treatment

► NEITHER electric stimulation nor convulsion may be necessary components in the electroshock treatment of certain types of mental illness.

Laughing gas, truth serum and other anesthetics may be as effective as the electroshock.

This is suggested by research of Drs. Norman Q. Brill, Evelyn Crumpton, Samuel Eiduson, H. M. Grayson, L. I. Hellman and R. A. Richards of the University of California at Los Angeles Medical School and the Los Angeles VA Center (Brentwood Neuropsychiatric Hospital).

A group of 97 mental patients were involved in the study. Sixty-seven of the group were schizophrenics. The remainder were depressed patients.

Patients were assigned at random to one of five treatment groups: 1. conventional electroshock therapy (EST); 2. a combination of EST and the drug, anectine; 3. EST and truth serum (pentothal); 4. pentothal alone, and 5. laughing gas (nitrous oxide) alone.

OBSTETRICS

Study Russian Obstetrics

► PREGNANT Russian women can legally choose to have their baby or an abortion.

If the women want their babies, the government gives them the best care available, a California physician reports.

If the baby is unwanted by the mother, she can arrange for a legal abortion, if the choice is made during the first three months of pregnancy, Dr. Lloyd F. Smith of Monrovia, Calif., reports in *GP* (June), the publication of the American Academy of General Practice.

The annual abortion rate in Moscow is close to 36,000, Dr. Smith speculates. He recently returned from a visit to a Moscow maternity hospital.

Every Russian doctor who expressed an opinion on the matter was an atheist, eliminating any moral problem. Consequently, Dr. Smith says, the question is reduced to what is good for the State and what is desired by the patient.

The Russians stress natural childbirth delivery. The pregnant women meet in small groups to receive instructions concerning the process of labor and delivery. Little medication is given during any phase of labor or delivery.

Women whose delivery promises to be a normal event are assigned midwives. Complicated cases receive care by a trained obstetrician. The midwives reassure the patients and build up a bond of confidence, the visiting American doctor noted. However, if the midwife finds any abnormality occurring in the process, she immediately calls in one of the many available trained specialists.

Dr. Smith reports he saw only iodine used as a skin antiseptic in Russia.

In the non-shock treatment groups EST was simulated so that all patients thought they were receiving some form of electroshock treatment.

All types of treatment led to marked improvement in the patient as measured by psychiatric evaluations and psychological tests. There were no statistically significant differences in the benefit from variations of electroshock therapy and the anesthetics alone.

These results suggest neither electrical stimulation nor convulsion is a necessary component of treatment, particularly for chronic schizophrenics, the doctor said.

Repeated rapid induction of unconsciousness may be the effective therapy component. Or such psychological factors as the treatment's meaning to the patient, desire for punishment, etc., and the unusual amount of care and attention to the patient involved in the experimental procedures may be important factors.

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After the baby is born, it is washed, measured and weighed. The eyes are cleansed with a solution.

A woman usually stops work 56 days before her expected confinement. She is usually allowed another 56 days after the delivery. When she returns to work, she puts the baby in a nearby convenient nursery.

While the hospital buildings in Moscow were old, they were clean. The midwives impressed him as experts, Dr. Smith says. However, there seemed to be a severe shortage of drugs.

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ARCHAEOLOGY

Techniques Clue to Pre-Columbian History

► SCIENTISTS are trying to tie up the loose ends of pre-Columbian American history by studying the techniques of woven plant materials.

Dr. Charles E. Rozaire, University of California at Los Angeles archaeologist and assistant curator of the Southwest Museum in Los Angeles, has found that certain twining techniques of weaving plant materials may be a clue to the relationship of groups of ancient Indian tribes in North America.

Earlier evidence of twined weaving comes from the northern Great Basin of North America. Radioactive carbon dating methods indicate that the woven fragments from this region may be as much as 10,000 years old.

The UCLA archaeologist has made a

study of similarly woven materials found on San Nicolas Island off the California coast.

The California relics are about 800 years old, Dr. Rozaire says. They consist of woven sea-grass skirts, mats, robes, basketry fragments, and braided and twisted cordage.

Polynesian-like traits have been noted in the material from California's Channel Islands. But the twining techniques and resultant products are more characteristic of the North American mainland.

Thus types of weaving in ancient fragments, along with recovered pottery and arrowheads, may be clues to the relationships of some widely scattered peoples in prehistoric times.

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MEDICINE

U.S.S.R. Exports Doctors

Soviet Russia's competition with the United States in the field of science has been extended to include the exporting of trained medical personnel to needy countries.

► RUSSIA is methodically preparing to export trained doctors, nurses and other health personnel throughout the world.

Russia now has 2,750,000 such persons, better than one out of every 100 citizens. According to Russian statistics, U.S.S.R. medical schools are turning out 16,000 physicians a year, or more than twice as many as the United States.

These facts were told to the Manufacturing Chemists' Association meeting in White Sulphur Springs, W. Va., by John T. Connor, president of Merck & Company.

The most noteworthy aspect of the Russian doctor is her sex, for three out of four physicians are women, he pointed out. By 1956, Russia had 164 doctors per 100,000 people compared with 130 per 100,000 in the U. S.

However, quality is something else again, he noted. American doctors receive approximately 22 years of education before starting a practice of their own. The Russian counterparts receive only 16 years. But since there is no "family doctor" in Russia, the physicians there never enter private practice. Instead, physicians work at state controlled polyclinics, where they are on duty for certain hours daily.

The care the patient receives at the clinic may not be up to American standards, the drug laboratory president said, but Western observers have noted that it is warm, thorough and human.

Other aspects of Russian public health which he compared with American standards included:

MEDICINE

New Viruses Paralyze

► TWO NONPOLIO viruses have been found to cause paralytic disease.

Thus an individual can receive adequate vaccine protection against polio and still develop a paralytic disease.

The two viruses are called ECHO and Coxsackie. They have been associated with aseptic meningitis, a disease that attacks the membranes that envelop the brain and spinal cord. It is characterized by fever, headache and stiffness of the neck.

Polio viruses have been believed to be the only ones that cause paralysis. But two properties formerly thought to be unique for polio viruses were found to be shared by ECHO and Coxsackie viruses, the scientists report in the *Journal of the American Medical Association* (June 7).

They found six cases of paralytic disease originally diagnosed as polio were probably caused by the two viruses. These viruses, but no polio viruses, were isolated

1. Medical research that seems to have suffered from a relatively low priority since the Revolution. However, while well behind the West, it is beginning to pick up again.

2. Development of drugs that the Russians themselves admit is completely in the negative. The West has discovered every major drug group since the Russian Revolution, 1917: antibiotics, vitamins, sulfa drugs, anti-diabetics, hormones, anti-hypertensives and mental health drugs. So far, Russia has produced none.

Rather than investing millions of dollars in research, development and testing, they can pirate drugs from the West. Even so, Russian production of these drugs lags because they lack the complex experiences and facilities needed to produce them.

Mr. Connor cited one case, that of cortisone. The Russians are still unable to produce it satisfactorily, although they have translated the correct formula for it from available journals.

3. Life-expectancy in Soviet Russia in 1955-56 was 67 years. The American counterpart is 69.5 years. This was done, for the main part, by adopting American standards of sanitation and control of contagious diseases.

Most of us have never thought of medicine as an instrument of foreign policy, Mr. Connor explained. Yet, the export of trained health personnel by Russia to needy countries will bring a promise of long life to many peoples, he predicted.

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ceived polio vaccine does not necessarily mean that the vaccine failed, the investigators stress.

The six investigators, five of whom are at the University of Pittsburgh Graduate School of Public Health, include Dr. William McD. Hammon, Dr. David S. Yohn, Rose A. Pavia, Gladys E. Sather, Lambert W. McCloskey, and Dr. Ernest H. Ludwig who is now at Pennsylvania State University, University Park, Pa.

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SUPER BUSHING—This bushing is being checked before it is lowered into an oil tank for testing at the General Electric Company's High Voltage Laboratory at Pittsfield, Mass. The G-E has announced plans to transmit three-quarters of a million volts over a four and one-half mile line being built near Pittsfield. Electric power at super voltages higher than ever before transmitted will be carried on the line, enough power to supply a city of 1,000,000 persons.

● RADIO

Saturday, June 28, 1958, 1:30-1:45 p.m., EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS radio network. Check your local CBS station.
Dr. Ralph A. Krause, associate director, Stanford Research Institute, Menlo Park, Calif., will discuss "Research for Future Progress."

PUBLIC SAFETY

Power Mower Injuries Up

► A POWER MOWER can cut grass but when handled carelessly can cut or injure the operator or a bystander, too.

A recent two-year study in Georgia on power mower accidents revealed that 737 occurred in that period. The number is constantly increasing.

Most of these accidents are caused by carelessness. The most common accident occurs as the operator attempts to start the machine, Dennis Orphan, associate editor, reports in *Today's Health* (June) published by the American Medical Association.

Operators ignore safety procedures by starting the machine with one or both feet under the back or side of the machine.

The second most common accident occurs when the operator mows on a hill or incline. He loses his footing and the machine rolls back over his feet.

A four-cycle engine, turning a 20-inch blade at 3,000 revolutions per minute, can pick up a nail or stone and hurl it at a speed of 170 miles per hour. A man in South Carolina died when a piece of wire thrown by a mower pierced his heart.

About 82% of the accidents were caused

by the gasoline rotary type mower. The machine is potentially more dangerous than the reel type because the blade whirls at a higher rate of speed, Mr. Orphan said.

Some of the rules he lists for safe operation of mowers include:

1. Clear the yard of all rocks, stones, nails, bones, wires, sticks, and other debris before you start.

2. Keep your feet in a safe position away from the blades when starting the mower.

3. Know how to stop the engine or disengage the clutch quickly in case of an emergency.

4. Never work on the machine while the motor is running.

5. Tip the mower by applying pressure on the handles. Never reach underneath and risk losing a finger.

6. Set the blades high when mowing on rough terrain to prevent debris from being ejected from the mower.

7. Do not let the mower pull you. Slow it down to maintain control.

8. Equip the electric mower with a ground wire.

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MEDICINE

Study Homosexual Pattern

► THE HOMOSEXUAL is the victim of his own emotional problems and environmental factors, not a victim of hormonal imbalance, alcoholism or genius.

Many of the beliefs about homosexuals, such as their marked tendency toward effeminacy or their intellectual superiority, were not supported by a recent study among 64 known male homosexuals imprisoned for illegal homosexual activities. The study revealed, however, that a history of neurotic behavior and psychiatric illness was frequently found among the homosexuals.

In addition, a background of alcoholic parents and broken homes seemed to be important, three doctors report in the *British Medical Journal* (June 7).

The homosexual prisoners were not more intelligent than average, but 55% of them were interested in art and culture. This is a higher percentage than would be expected from the normal population, the investigators say.

Touching on the development of homosexuality in individual cases, the doctors said that these factors were revealed:

Apart from those who were seduced at an early age, in about 40% the sex drive was homosexual from the beginning. Although this does not rule out the possibility that homosexuality originates in the mind, it does demonstrate that it is not necessarily a manifestation of vice. Perhaps it has some of the characteristics of instinctive behavior with which the individual has to contend or accept, whether he approves of it or not, the authors suggest.

The most common forms of homosexuality practiced by these men were sodomy and mutual masturbation. Furthermore, of 60 cases with valid data, 83% were promiscuous. The remaining 17% had selected partners. Several of those who were promiscuous said they would have preferred a stable association.

The reasons given for desiring a single partner were affection and greater safety from the police and venereal disease.

Twenty-four of the prisoners were married and had produced 43 children, Drs. R. E. Hemphill and A. Leitch of Bristol Mental Hospitals, Bristol, England, and Dr. J. R. Stuart, Garlands Hospital, Carlisle, England, report.

They stress that the continuous conflict between the masculine role demanded by our society and feminine urges appears as the reason for the effeminate manner found in a small proportion of homosexuals.

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ENTOMOLOGY

Cockroaches Make Migrations En Masse

► COCKROACHES migrate en masse, usually overcoming anything that stands in the way of their movement.

The mass migrations of cockroaches, which may play an important role in the transmission of disease, usually occur at night and are seldom seen.

Eyewitness reports of these "marches"

have been recorded, however, say Drs. Louis M. Roth and Edwin R. Willis, U. S. Army Quartermaster Corps scientists, in a report published by the Smithsonian Institution.

They cite these, for examples:

On a dark drizzly day in Washington, D. C., thousands of German cockroaches were observed to come from the rear of an old restaurant and march directly across a muddy street to the building on the opposite side. Several men with brooms were unable to stop the advance.

One night in New Haven, Conn., cockroaches from a "heavily infested" city dump swarmed on nearby houses as far as a city block away.

In Austin, Minn., a mass migration of the pest creatures was witnessed from a city dump to a new sewage-treatment plant a quarter mile away. The insects "completely overran the plant, even penetrating the electrical conduit system." Later, when certain electrical junction boxes were opened they were literally packed with dead roaches. The migration occurred just prior to the first snowfall, shortly after the city council decided to discontinue use of an open dump."

Why do the roaches mass migrate? In the case of the trek across the street in Washington, the scientists explain it resulted from the pressure of overpopulation.

Cockroach travels have been traced by using radioactive tagging, Drs. Roth and Willis point out. Large numbers of cockroaches have been captured, rendered radioactive, mixed with untreated populations and traced.

It has been conclusively demonstrated, the Army scientists said, that cockroaches do migrate from sewers into homes. The extent of migration probably is much greater than the recovery of the tagged insects would indicate.

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ENTOMOLOGY

Fly's Mating Habits May Lead to Its Death

► BECAUSE the female screwworm fly is a "one fly" female, mating once in her lifetime, U. S. Department of Agriculture scientists hope to be able to rid the southeastern part of the country of the pest.

The USDA and the Florida Livestock Board said that plans were being made to release millions of sterilized, laboratory-raised male flies over screwworm infested areas of Florida and southeastern Georgia. Females mated to these males do not reproduce. The eradication program will take more than one year and, so far, almost \$5,000,000 has been appropriated by the Federal Government and the Florida legislature.

Earlier studies in Florida and on the Caribbean island of Curacao have shown this method of pest control could be successfully used where danger of reinestation is small. Florida's geography—most of the state is a peninsula—and the fact that the screwworm seldom spends the winter north of Gainesville, Fla., make possible eradication of the pest in the Southeast.

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BIOLOGY

Find Extra Chromosome

The discovery of a supernumerary chromosome in man may have solved the puzzle of why some persons have been found to have 48 chromosomes while others have 47 or 46.

► THE DISCOVERY of an extra chromosome in some males may have solved the problem of just how many chromosomes man has.

Scientists have found men with 48, 47 and 46 of these tiny bodies that are associated with genes and heredity. This was a puzzle because each species of plant and animal is supposed to have one constant number of chromosomes.

Now, however, all three numbers seem to be right for the species *Homo Sapiens*.

There is evidence, reported in *Science* (June 6), that the presence, either singly or in duplicate, or absence of a "supernumerary chromosome," or extra one, determines the total.

Working with tissue from 15 Japanese and eight American whites, Dr. Masuo

Kodani of the State University of Iowa reports finding the extra chromosome in both groups. Nine Japanese had 46 chromosomes, including the paired sex chromosomes, "X" and "Y", and 22 like chromosomes some pairs.

One individual always had 47. Examination revealed a single small chromosome in addition to the 46 found in the nine other Japanese studied.

In the remaining five Japanese, 48 chromosomes were found. In each of these one of the chromosome pairs was identical to the single extra chromosome.

Earlier reports had accounted for the discrepancy between the "classical" total of 48 and the more recent finding of 47 chromosomes by saying the Y-chromosome does not exist in man and that the total

number of chromosomes in the male is 47.

Apparently, Dr. Kodani reports, the "differentiating factor is the chromosome which occurs singly in some individuals but as a duplicate in others. This chromosome appears to be a supernumerary chromosome."

While none of the eight whites studied included a 47-chromosome individual, Dr. Kodani believes there is little doubt such individuals exist in this human ethnic group.

There was no evidence, Dr. Kodani reports, that the extra chromosome was produced by the breaking up of either a sex chromosome or any other. The number of cases reported of the varying chromosome numbers is still too small, Dr. Kodani concludes, to provide reliable estimates of the frequencies of the different numbers for the Japanese and white groups.

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HORTICULTURE

Cutting Roses Can Help Or Hinder Their Growth

► HOW YOU CUT the roses from the bush can be very important in determining how long the bush, and the bouquet, last.

First of all, the U. S. Department of Agriculture warns, use a sharp knife or pair of scissors when you do cut. Breaking or twisting off flowers injures the wood.

Timing the cutting is also very important. During the first season of bloom the flowers should be cut with very short stems only. In fact, if no early flowers are cut, the rose plant will probably develop into a large bush by fall when some flowers may be cut.

At least two leaves should remain on the stem between the cut and the main stem. With tea roses, make the cut just above the topmost spray of five leaflets; if the stem is as thick as a pencil, the cut may be made above a higher three-leaflet spray.

When its petals fall the rose should be removed from the bush.

For cut flowers, choose roses that have just begun to unfold. They will also keep better if they are cut in the late afternoon.

Flowers that have begun to wilt prematurely indoors can be revived if action is taken quickly. The USDA flower experts recommend making a slanting cut approximately an inch up from the stem end and placing the stems in very hot water for a few minutes. Boiling water removed from the stove for a few minutes is about the right temperature. Follow this by plunging the stems quickly into cold water.

The hot water drives off any air bubbles that may form in the water-conducting tissues of the stem. Then the cold water can rise and revive the flower. Flowers that have been wilted for several hours will not be helped this way, however.

A USDA Home and Garden Bulletin, No. 25, *Roses for the Home*, contains many useful tips on the care and growing of roses. Single copies are available free from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.



LOW-NOISE AMPLIFIER—A new low-noise ultra-high frequency and microwave amplifier now under development at Bell Telephone Laboratories uses special semiconductor diodes. M. Uenohara mounts a diode in a wave-guide structure for checking its amplifying properties.

Science News Letter, June 21, 1958

ASTRONOMY

Plan Star Photography From High-Flying Balloon

► SCIENTISTS will try again about mid-July to photograph the stars from a manned balloon at 40,000 feet, above the bulk of the earth's atmosphere.

The aim is to find out how high man has to go in order to get sharp images of stars on photographic plates. Dr. Arthur Hoag of the U. S. Naval Observatory, Flagstaff, Ariz., is building a special telescope with which he will make these measurements, SCIENCE SERVICE learned.

The first attempt at photographing stars from above the earth's atmosphere was unsuccessful because the balloon was not sufficiently stable. Scientists hope a slower ascent rate will solve this problem. The May try yielded only qualitative information on how heavenly objects appear from very high altitudes, but the next flight is aimed at obtaining actual readings.

The May flight did, however, yield some aeromedical information. Telemetered records, now under more intensive study, indicated that one of the scientists had a change in the rate of electrical conduction from the top to the bottom of his heart when the pressure breathing equipment was turned on at about 37,000 feet. If confirmed, this suggests pressure breathing should be dispensed with at high altitudes.

Dr. Hoag's observations should settle the question of whether it is necessary to go to 40,000 feet to obtain steady stellar images or whether 20,000 feet would be enough, as some French astronomers believe. Launching a stable balloon platform for a telescope would be much less complex for the lower altitude. An airplane's vibrations make aircraft unsatisfactory for a telescope platform.

Both flights are part of the program known as Strato-lab, a project of the Navy's Office of Naval Research.

Science News Letter, June 21, 1958

ASTRONAUTICS

Space Research to Benefit Average Man at Once

► ADVANCED RESEARCH programs into space travel will have immediate benefits for the average taxpayer, even though he may not be interested in traveling to the moon.

Space research will almost immediately aid in solving automobile and air traffic problems. It may also provide the key to cheap, unlimited power as well as unlocking the secrets of today's physical and psychological ills.

These are but a few of the important by-product benefits the nation's space research program is beginning to offer the average man-in-the-street.

Even higher "f" in high fidelity phonographs will be among the secondary fruits of space research, Robert E. Gross, chairman of the board and chief executive officer of Lockheed Aircraft Corporation, Burbank, Calif., told the first national Missile Industry Conference in Washington, D. C.

As an example of medical benefits beginning to flow from the space research program, Mr. Gross cited work being done with a giant mathematical computer at the Lockheed Missle Systems Division.

Installed primarily to aid engineers, the computer is also being used to study human behavior with respect to missile reliability. New information about heart disease already has come from the project.

In attacking the missileman's major problem, that of reliability, scientists have had to develop newer and purer materials, which already are finding their way into television equipment and phonographs.

Mr. Gross spoke at the Dr. Robert H. Goddard Memorial Dinner, honoring the nation's pioneer rocket scientist.

Dr. Werner Von Braun was awarded the Robert H. Goddard trophy at the dinner, and the Borg-Warner trophy was awarded to the Lockheed Aircraft Corporation for its work on the Polaris missile.

Science News Letter, June 21, 1958

METEOROLOGY

Definite Weather Pattern Needed for Tornadoes

► DEFINITE weather patterns are needed to spawn tornadoes, the swirling storms that swoop down from a line of thunderstorm clouds to level anything in their paths.

Whenever two large air masses—one moisture-rich and warm, the other dry and cooler—battle for supremacy, the stage is set for stormy weather.

If other factors are right, the resulting thunderstorms may give birth to a tornado's whirling funnel.

One factor is a big temperature difference between the tropical air and the colder air, such as temperatures in the high 90's ahead of the cold front, in the 60's behind it. Such a sharp cold front sets off developments in the warm air. A line of thunderstorms, or squall line, is established.

A pulse, or "pressure jump line," is sent out ahead of the squall line, most weathermen believe. The pulse sets up a vertical motion to help release the pent-up energy of the warm air.

High in the atmosphere there is often a swiftly moving jet stream, usually from the west, bringing with it drier, cooler air, that helps the tornadic conditions.

Trying to learn what the other factors are and their exact relationships is part of the Weather Bureau's research program on severe storms. In addition to meteorologists at the Weather Bureau, those at several universities and private research institutes are trying to find one or more unique features that precede tornadoes and point the way to their earlier detection.

The methods for doing this range from making miniature tornadoes in laboratory boxes to using airplanes flying into the squall lines in which twisters are formed to learn more about exact weather conditions there; from studying radar photographs of tornadoes and lightning discharges to feeding complex mathematical formulas into computers.

Science News Letter, June 21, 1958

IN SCIENCE

PHARMACOLOGY

Drug Substitutes For Progesterone

► A DRUG substitute for a hormone which prevents miscarriage or premature birth has been developed.

Labeled Provera by the manufacturers, Upjohn Company, Kalamazoo, Mich., the drug acts similarly to the hormone progesterone, which helps regulate the duration of pregnancy.

It has been observed in animal tests that Provera also is a potent ovulation inhibitor, suggesting that it may prove useful as an oral contraceptive. Upjohn clinicians report in the *Journal of the American Chemical Society* (June).

The research group reports the drug was used on pregnant rats that had their ovaries removed on the eighth day of pregnancy. Provera was 25 to 100 times as potent as progesterone in maintaining pregnancy to its proper term.

Without progesterone, which is supplied by the ovaries, the uterus contracts, or goes into labor, and the fetus is expelled. The new drug has proven capable, in very small doses, of replacing natural progesterone. Dr. Jacob C. Stucki, physician specializing in endocrinology, chemists John C. Babcock, Erwin S. Gutsch, Milton E. Herr and John A. Hogg, and biologists Lester E. Barnes and William E. Dulin, report.

The chemical name of the drug is 6 alpha-methyl-17 alpha-acetoxyprogesterone. In tablet form, it was 100 to 30 times as active as ethisterone, an orally active drug similar to progesterone.

Science News Letter, June 21, 1958

AGRICULTURE

Grass Length Influences Moisture Loss From Soil

► THE KIND of grass planted in a pasture can significantly influence how much water is lost from the soil, two New Zealand scientists have found.

K. J. Mitchell and R. L. Closs of the Department of Scientific and Industrial Research studied the rate of moisture loss under varying conditions of temperature and with both long and short pasture grasses.

They found that with high temperatures on a sunny day, under conditions of high intensity of radiation, water evaporation from short grass is greater than from long grass. In contrast, with lower temperatures more water is lost from the long grass.

Wind velocities and other factors, such as the physical structure of the grass, will also influence the rate of water evaporation, the scientists report in *Nature* (June 7).

Science News Letter, June 21, 1958

SCIENCE FIELDS

PUBLIC HEALTH

Data Points to Passive Transfer of Tumor Fighter

► AN ANTI-CANCER factor may be circulating throughout the body in a manner similar to antibodies.

A recent study of the passive transfer of anti-tumor factors through the milk of rats indicates these factors may act much as the germ fighters which immunize humans against disease, B. Sekla of the medical faculty, Charles University, department of general biology, Prague, Czechoslovakia, reports.

The investigator took newborn albino rats from their mothers. The "orphaned" baby rats were given for nursing to black rats which had been previously immunized against tumors. The offspring of the black rats were given to the albino mothers. A control group of newborn albino rats were kept with their mothers.

The baby rats of both the control and the switched groups received, by injection subcutaneously, equal doses of live tumor cells.

The results of this experiment showed those albino tumor-prone offspring which nursed with the black, immunized mothers, developed tumors within 20 days in a ratio of 5 to 11. Those black, immune offspring that nursed with the albino, tumor-prone mother rats, developed tumors within 20 days in a ratio of three to seven. The control group of albino, tumor-prone offspring which nursed from their own mothers, developed tumors in a ratio of nine to nine.

Results of another experiment showed albino, tumor-prone rats, when left to nurse with their own mothers that had received shots of immunizing serum, did not develop tumors at as great a rate as those offspring nursing with their unimmunized mothers.

These results closely parallel the findings by other scientists that bacterial antibodies can be transferred through milk to sucklings, the scientist states in *Nature* (June 7).

Science News Letter, June 21, 1958

EDUCATION

Math Teachers Go Back to School

► HIGH SCHOOL mathematics teachers in New York City are going back to school on "company time and at company expense."

Starting this fall, 600 teachers in the metropolitan area will receive time off during the school year to learn the "newer concepts of mathematics." The cost will be borne by the schools.

The learn-and-earn plan was adopted by superintendents of schools of the Metropolitan School Study Council, an affiliate of the Institute of Administrative Research of Teachers College, Columbia University.

The back-to-school program is an outgrowth of suggestions on ways in which to improve mathematics teaching and interest more students in mathematics made by the Commission on Mathematics of the College Entrance Examination Board.

In addition to bringing teachers up-to-date in mathematics the Commission also would like to see the following done, according to Dr. Albert E. Meder, formerly director of the Commission and currently dean of administration and professor of mathematics at Rutgers University:

1. Eliminate the terms algebra, geometry and others and replace them with elementary, intermediate and advanced mathematics, that would be taught as part of mathematical structure, not just for "manipulative" value.

2. Cut down the number of theorems now being taught in geometry and add material for better understanding of spatial concepts.

Science News Letter, June 21, 1958

AERONAUTICS

Air Navigation System Helps Avoid Collisions

► AN AIR navigation system has been designed to simplify the problem of air traffic control and reduce the hazard of mid-air collisions.

Called the High Density Air Navigation (HIDAN) method of flight control, it includes fully automatic, self-contained navigational and control equipment to be carried in the airplane itself.

In this manner, pilots will have before them in the cockpit at all times a picture of the airplane's actual course in relation to its intended course. Thus, pilots can execute their prescribed flight programs to waypoints and destinations with precision, Edwin A. Link, president of General Precision Equipment Corporation, explained.

The HIDAN equipment has two main components.

One is an airborne, automatic navigator called RADAN, an 89-pound device that supplies continuous ground speed and drift angle data.

The other component of the system instantly indicates the position of the aircraft and, when programmed for a flight, continuously calculates the divergence of the actual position of the aircraft from its planned position.

If the pilot fails to stay on flight program or gets off his course, his HIDAN equipment immediately shows him what he must do to get back on plan.

As the number of airplanes in flight increases substantially, the shortage of air-space will become more acute, especially in the areas around major terminals such as New York, Chicago and Los Angeles, Mr. Link pointed out.

This will result in more costly delays and more hazardous crowding until the new Airways Modernization Board system, including navigation methods such as HIDAN, goes into operation.

Science News Letter, June 21, 1958

ENDOCRINOLOGY

"Chemical Armor" For Pituitary Hormone

► AS PROTECTION against enzymes which might destroy them during routine tours of duty in the body, hormones of the pituitary gland may have a sort of "chemical armor."

Such is the implication of research by Dr. Jessamine Hilliard of the University of California at Los Angeles Medical School. Dr. Hilliard reports some of her findings in *Endocrinology*.

The "chemical armor" consists of a substance which inhibits the digestive activity of the enzyme pepsin. It was isolated in extracts from the pituitary gland.

Experiments indicate the pepsin inhibitor, although apparently associated with the pituitary hormone, is not directly involved in hormonal activity.

The hypothesis that the substance functions as a protective armor against a protein-attacking enzyme, probably pepsin, is based upon the fact that all known pituitary hormones are protein in nature. Thus they would be subject to destruction by such enzymes if not protected.

A similar type of "chemical armor" is found on the parasitic roundworm, Ascaris, Dr. Hilliard points out. The function there is to prevent the worm from being digested by pepsin in the host's gastric juice.

Science News Letter, June 21, 1958

EUGENICS

America Has Double Pattern of Marriage

► AMERICA has a double standard when it comes to marriage. The majority marry once and stay married until "death do us part." But a sizable minority practice a kind of polygamy within the law; they have mate after mate, although not more than one at a time.

This conclusion, reported by Thomas P. Monahan of the Philadelphia Municipal Court in *Eugenics Quarterly* (June), is based on a study of marriage statistics in Iowa. Iowa, a fairly representative area in the American Midwest, is one of only two or three states that gather records showing the previous marital status of couples entering into marriage.

Of 100 marriages of previously unmarried persons, only 16.6 end in divorce within a three-year period, Mr. Monahan reports. But where both parties had been divorced once before, the divorce figure doubles to 34.9 per 100 marriages. Where both parties had been divorced twice or more times before, the ratio climbs to 79.4 per 100. This group is what Mr. Monahan calls the "divorce-prone."

The ratio is much lower for the previously widowed. It is only 9.9 when both parties were widowed once only, and only 2.0 when both were widowed twice or more.

"We are, in effect, operating a type of trial marriage system," Mr. Monahan comments.

Science News Letter, June 21, 1958

ASTRONOMY

Brilliant Sky Seen in July

An unusually brilliant display of stars and planets will be seen in the southern sky during July. Jupiter will be the brightest object, with the exception of the moon.

By JAMES STOKLEY

► TWO BRIGHT PLANETS, Jupiter and Saturn, have joined with the stars of the summer evening to make an unusually brilliant display in the southern sky.

These are shown on the accompanying star maps, which show how the sky looks at about 10:00 p.m., your own kind of standard time (add one hour for daylight saving time) at the first of July, and an hour earlier in the middle of the month.

The most brilliant evening object, with the exception of the moon, is Jupiter, seen in the southwest close to the star Spica which is part of the constellation of Virgo, the virgin. Spica is about a tenth as bright as Jupiter.

Farther left, in the south, you can see Saturn, which is about a sixth as bright as Jupiter. This planet is in Ophiuchus, the serpent-bearer, just above Scorpius, the scorpion. The brightest star in the latter group is Antares, which is distinctly red in color.

Vega: Brightest Star

The brightest star now visible surpasses Saturn, but not Jupiter. This is high in the east and is shown on the map of the northern half of the sky. It is Vega, in Lyra, the lyre. Just below it is Cygnus, the swan, with bright Deneb; and to the right of this figure stands Aquila, the eagle, with Altair.

High in the southwest, above Virgo, you can find Bootes, the bear-driver, in which stand Arcturus. These six stars, Vega, Arcturus, Altair, Spica, Antares and Deneb, are all of the first magnitude, in the astronomical scale of brilliance.

Among stars that are somewhat fainter, although they are familiar, are those of Sagittarius, the archer, seen in the south just to the left of Scorpius. This figure resembles a teapot, with the spout to the right, close to the curved row of stars that form the scorpion's tail.

The big dipper, mainly of stars of the second magnitude, hangs in the northwest, part of Ursa Major, the great bear. The handle points upwards; at the bottom are the "pointers."

By following their line to the right, you can locate Polaris, the polestar, which is in Ursa Minor, the lesser bear. Farther right, near Cygnus, is Cepheus, a mythological king, and below it is Cassiopeia, the queen, marked by a group of stars forming the letter W.

Another interesting although fainter constellation is shown directly overhead. This is Hercules, named after the strong man of mythical lore. Six of the stars of this group, in the western part of the constellation, outline the very inappropriate figure of a but-

terfly. The body runs east and west, with one wing to the north and the other to the south.

During July two other planets appear later at night.

Around midnight Mars rises, in Pisces, the fishes, and can be recognized by its red color, as well as its brilliance. Mars is steadily approaching the earth, for a relatively close visit of 45,000,000 miles in November. On July 16 it will be at the same distance as the sun, a little more than 94,000,000 miles away.

Venus Is Early Riser

Venus, even brighter than Jupiter, appears in the northeast about two hours before sunrise. And about July 26 Mercury will be farthest east of the sun, remaining above the western horizon after sunset for a short time, but not long enough to be seen easily.

At this time of year, soon after the beginning of summer, it is fairly late in the evening before the sky gets really dark and the stars can be seen in their full glory. But, for the same reason, this is a good time to see the interesting but seldom noticed appearance of the earth's shadow after sunset.

It is generally known that, at an eclipse of the moon, the edge of our planetary shadow appears on the lunar surface. Less well-known is the fact that every clear evening you can see the shadow in the earth's atmosphere.

After the sun has set, look in the opposite direction, which is to the southeast at this time of year. At about the time of sunset, all that you notice is a pinkish glow, very low in the sky. But shortly, underneath the pink, there is a dark band, which gradually enlarges, as its upper edge climbs higher. This is actually the shadow of the earth. Above it, the sunlight is shining on the atmospheric haze in the east, making it brighter; so below, where the earth shades

it, it looks darker. This effect appears mainly in the troposphere, up to a height of about five miles, where there is some dust, and not in the stratosphere, at higher levels.

Although this shadow gradually climbs to the zenith, and then descends in the west, it becomes less and less distinct. But then there is a second shadow in the east which repeats the phenomenon of the first. The light rays that produce this are not coming directly from the sun. They result from the sunlight that is reflected from the higher parts of the atmosphere, beyond the western horizon, on which the sun is still shining.

Looking to the western sky in the early morning, before sunrise, you may see a similar effect in reverse, with the shadows starting high and descending to the horizon, finally disappearing completely as the sun rises in the east.

There are some other interesting appearances in the sky at sunset.

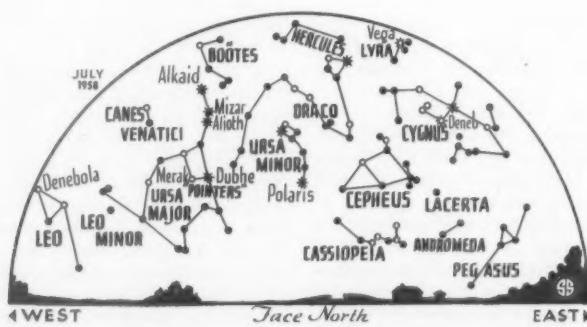
Sometimes beams of light may fan out from the sun, hidden behind clouds, or even with the clouds behind the horizon. These are the crepuscular, from "crepusculum" which is Latin for "twilight" rays. Here the clouds in front of the sun have an irregular upper edge and the rays of sunlight shine through the gaps, toward you.

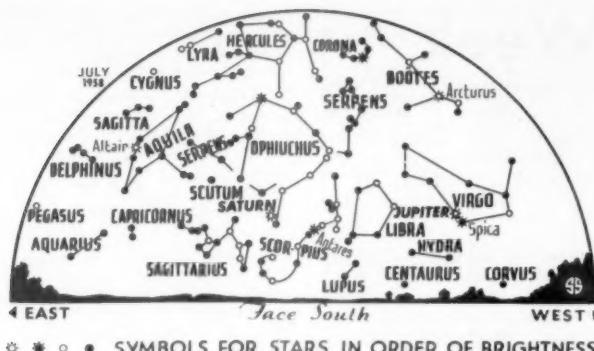
Like searchlight beams, these are visible on account of the scattering of their light by the atmosphere, while the spaces between them are dark. Because the sun is so far away, these beams are parallel, but they seem to converge, toward the sun, because of perspective, like the parallel tracks of a railroad.

Spectrums and the "Green Flash"

And then sometimes, just as the sun disappears behind the horizon, the last bit of its upper edge that you see may turn momentarily a brilliant green. This is called the "green flash."

What happens in this case is that the long layer of atmosphere through which the sun's light has to pass, on the way to your eyes, acts as a prism and spreads the sun out into a vertical spectrum, red at the bottom, with the other colors, orange,





• * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

yellow, green, blue and violet, above. But because the sun presents the appearance of a disc, the red from one part is mixed with the green from another, and the spectrum is not a very pure one.

At the last moment, before sunset, however, when only a thin sliver of the upper part of the disc is still visible, this does not occur, and the spectrum becomes purer.

All this happens in the distance, beyond the horizon. The red, orange and yellow rays are bent downwards so much that they do not get beyond the horizon, to your eyes.

The blue and the violet rays, which would be on top, are absorbed by the great thickness of atmosphere through which they have to pass, so they do not reach you at all. Thus green is the last you see, and that causes the sun to show a green flash, just before it disappears from view.

The same thing may happen as the sun is rising, and the first bit to appear may show this green color. But the effect is not a common one; conditions have to be just right for it to appear. That is probably why, according to an old Scottish legend, the person who has seen it would never be deceived in love, for it was supposed to

give that person the magical power to look clearly into one's own heart and into the hearts of others!

Celestial Time Table for July

July	EST	
1	1:04 a.m.	Full moon.
5	3:00 p.m.	Earth in aphelion (farthest from sun for year)—distance 94,449,000 miles.
8	6:00 p.m.	Moon in apogee (farthest from earth for month) — distance 251,100 miles.
	7:21 p.m.	Moon in last quarter.
9	10:00 a.m.	Moon passes Mars.
14	1:21 a.m.	Moon passes Venus.
16	1:33 p.m.	New moon.
21	6:00 a.m.	Moon in perigee (nearest for month) — distance 229,100 miles.
22	10:43 p.m.	Moon passes Jupiter.
26	4:00 p.m.	Mercury farthest east of sun.
	10:23 p.m.	Moon passes Saturn.
29	early a.m.	Meteors visible radiating from constellation Aquarius.
30	11:47 a.m.	Full moon.

Subtract one hour for CST, two hours for MST, and three for PST.

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BULGE IN THE SEA—New world maps based on gravity research at Ohio State University show many irregularities in the earth's surface. Dr. Weikko A. Heiskanen, supervisor of the Air Force-sponsored project, indicates a "bulge" which the study has revealed at the western end of the Mediterranean Sea.

ENGINEERING

Noise of Heavy Trucks Reduced by Research

► UNDESIRABLE NOISES made by heavy truck tires and exhausts soon may be almost eliminated.

New tire tread designs already have reduced much of the noise associated with heavy trucks, and even better designs may be expected soon from research laboratories, T. A. Robertson and J. H. Cox, Firestone Tire and Rubber Company, reported to the Society of Automotive Engineers meeting in Atlantic City, N. J.

Tires without tread produce the least noise, but they are not practical, the engineers said. Some of the new designs feature zig-zag treads, parallel grooves or uneven tread spacing.

Sound recording machines and specially developed instruments for measuring sound are playing the major laboratory roles in reducing exhaust noise, Dean G. Thomas, director of research, Nelson Muffler Corporation, reported.

Exhaust systems that are almost noiseless, but still efficient in large truck operation, will result from current research.

Glass Engine Parts

► MAJOR WORKING parts of engines and even automobile brake shoes can be made of glass, the engineers learned.

Pyroceram, the trademark for a series of glass-ceramics announced a year ago by Corning Glass Works, Corning, N. Y., was described as lighter, stronger and more heat-resistant than most metals.

Drs. W. W. Shaver and S. D. Stookey of Corning's Atomic Energy Department suggested the new glass-ceramics for use as piston heads, high-temperature bearings, brake shoes and structural parts of hypersonic aircraft.

Science News Letter, June 21, 1958

BOTANY

Waxy White Flowers Form Belt on Tree Bark

► BROAD, elaborately woven belts of waxy white flowers that circle the trunks of trees are just one of the plant curiosities of Barro Colorado Island in the Panama Canal Zone.

The tiny blossoms, it would take more than five lying side by side to cover an inch, are parasites found only living under the bark of living trees. They break through to the surface when they flower.

Other strange plants include one that is unique to the Island. *Aphomeris panamensis* has no chlorophyll and has been found only three times in a half century.

There are also more than 70 species of slime molds on the Island, fungus-like growths that behave like plants and like animals at various stages in their life cycles.

Barro Colorado Island is used by the Smithsonian Institution as a jungle life preserve where native plants and animals can be studied."

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C. Request free publications direct from publisher, not from Science Service.

ADVANCES IN CANCER RESEARCH, Volume V—Jesse P. Greenstein and Alexander Haddow, Eds.—*Academic*, 463 p., \$10.80. Includes discussions of tumor-host relations and specific tumor antigens.

AIDS TO ORGANIC CHEMISTRY FOR MEDICAL STUDENTS—George A. Maw, foreword by Leslie Young—*Bailliere (Williams & Wilkins)*, 5th ed., 176 p., \$2.50. A simple presentation of the chemistry of compounds of biological and medical interest.

AN APPROXIMATE ANALYTICAL METHOD FOR STUDYING ENTRY INTO PLANETARY ATMOSPHERES—Dean R. Chapman—*National Advisory Committee for Aeronautics*, Technical Note 4276, 103 p., illus., paper, single copies free upon request direct to publisher, 1512 H Street, N.W., Washington 25, D.C.

THE ATOM AND THE ENERGY REVOLUTION—Norman Lansell—*Penguin*, 200 p., paper, 85¢. A short comprehensive introduction to the subject of atomic energy in relation to the other sources of energy.

AUTOMATIC CONTROL: Principles and Practice—Werner G. Holzbock—*Reinhold*, 258 p., illus., \$7.50. Offers the practical results of scientific research on control systems in non-mathematical terms.

AVIATION FACTS AND FIGURES 1958—Compiled by Rudolf Modley and others, Ben S. Lee, Ed.—*Am. Aviation Publications*, 135 p., illus., paper, \$1.50. A compilation of facts gathered from many sources.

BIOGRAPHICAL MEMOIRS, Volume XXXI—Alfred H. Joy and others—*Columbia Univ. Press* for Nat. Acad. of Sciences, 396 p., illus., \$5.00. Biographies, portraits and bibliographies of deceased members of the N.A.S.

BIOLOGY AND HUMAN PROGRESS—Louis Eisman and Charles Tanzer—*Prentice-Hall*, 2nd ed., 544 p., illus., \$4.80. A general biology text based on classroom experiences of hundreds of teachers.

DARWIN'S CENTURY: Evolution and the Men Who Discovered It—Loren Eiseley—*Doubleday*, 378 p., illus., \$5. Less a biography of individuals than a story of how humanity came,

by degrees, to accept an idea foreshadowed two centuries earlier.

ENCYCLOPEDIA OF PHYSICS, Volume XLV—Nuclear Instrumentation II—S. Flügge and E. Creutz, Eds.—*Springer Verlag*, 544 p., illus., \$31. The latest volume of the famous "Handbuch der Physik." In English.

ENERGY FOR MAN: Windmills to Nuclear Power—Hans Thirring—*Indiana Univ. Press*, 409 p., illus., \$6.95. Deals with power production. A book useful to all those concerned with economic and industrial planning.

EVIDENCE OF PRENATAL FUNCTION OF THE CENTRAL NERVOUS SYSTEM IN MAN—Davenport Hooker—*Am. Mus. of Natural Hist.*, 41 p., paper, 75¢. James Arthur Lecture on the "Evolution of the Human Brain."

FLORENCE NIGHTINGALE AND THE DOCTORS—Zachary Cope—*Lippincott*, 163 p., illus., \$5.00. Based on her voluminous correspondence this book gives an account of how Florence Nightingale influenced some of the doctors of her time.

FLUID PRESSURE MECHANISMS—H. G. Conway—*Pitman*, 2nd ed., 235 p., illus., \$6.75. Covers hydraulic, pneumatic and compressed gas systems of high, medium and low pressure.

FUNDAMENTALS IN CARDIOLOGY—John B. Wild—*Thomas, C. C.*, 83 p., illus., \$4.50. A textbook for medical students.

GENETIC RESISTANCE TO DISEASE IN DOMESTIC ANIMALS—Frederick Bruce Hutt—*Comstock Pub. Associates (Cornell Univ. Press)*, 198 p., illus., \$3.50. On the desirability and feasibility of breeding stock that can resist exposure to disease.

THE HEAT BALANCE OF THE EARTH'S SURFACE—M. I. Budyko, translated from Russian by Nina A. Stepanova—*Office of Technical Services*, 259 p., illus., paper, \$4. A monograph of interest to those working in the fields of climatology, meteorology, land geography and oceanography.

HOW TO FORCE CHECKMATE—Fred Reinfeld—*Dover*, 2nd ed., 112 p., illus., paper, \$1.25. New edition of 1947 work titled "Challenge to Chessplayers," 300 practical immediate checkmates selected from master play.

HOW TO LIVE WITH DIABETES—Henry Dolger and Bernard Seeman—*Norton*, 192 p., \$3.50. Concerned with the problems of daily living for the person with diabetes.

HYPERMODERN CHESS: As Developed in the Games of Its Greatest Exponent, Aaron Nimzovich. The Definite Collection of Nimzovich's Revolutionary Games—Fred Reinfeld, Ed.—*Dover*, 221 p., illus., \$1.35. New edition of work first published in 1948 under the title "Nimzovich: The Hypermodern."

INDUSTRIAL NOISE MANUAL—AIHA Noise Committee, Kenneth M. Morse, Chairman—*Am. Industrial Hygiene Assn.*, 180 p., illus., paper, \$7.50. Information on the physical characteristics of noise, its measurement, its effect on exposed persons and its control.

AN INTRODUCTION TO CHEMISTRY—Charles Compton—*Van Nostrand*, 607 p., illus., \$6.85. Emphasis in this text is placed, through the use of condensed case histories, on the methods chemists employ.

MATTER, EARTH, AND SKY—George Gamow—*Prentice-Hall*, 593 p., illus., \$10. As the author puts it: "The plan for this book is that of a trilogy dealing first with things our size, secondly with things much smaller, and finally with things much larger than ourselves."

NATURAL SELECTION IN MAN—J. N. Spuhler, Ed.—*Wayne State Univ. Press*, 72 p., illus., \$3.50. Papers of the Wenner-Gren Supper Conference held at the University of Michigan in 1957, during a meeting of the Am. Soc. of Human Genetics and the Am. Assn. of Physical Anthropologists.

1958 HEAT TRANSFER AND FLUID MECHANICS INSTITUTE: Preprints of Papers—Howard W. Emmons and others—*Stanford Univ. Press* for the Institute, 264 p., illus., paper, \$8.50. Held at the University of California in June 1958.

PERSON PERCEPTION AND INTERPERSONAL BEHAVIOR—Renato Tagiuri and Luigi Petrullo, Eds.—*Stanford Univ. Press*, 390 p., illus., \$7.50. A contribution to the field of social psychology.

PHYSICS AND MATHEMATICS, Volume 2—D. H. Hughes, J. E. Sanders and J. Horowitz—*Pergamon*, 375 p., illus., \$14. Covers developments in the basic experimental and theoretical aspects of reactor physics since the 1955 Geneva Conference.

POPULATION: An International Dilemma—Frederick Osborn—*Population Council*, 97 p., graphs, \$2.00. A summary of the proceedings of the Conference Committee on Population Problems—1956-1957.

THE POPULATION AHEAD—Roy G. Francis, Ed.—*Univ. of Minn. Press*, 160 p., illus., \$3.75. Papers read at the Second Symposium on Population Problems held in 1957 at the Center for Continuation Study of the University of Minnesota.

THE PRENTICE-HALL WORLD ATLAS—Joseph E. Williams—*Prentice-Hall*, 122 p., 158 maps, \$9. Uses techniques of modern cartography; in addition to regional maps, geographic phenomena of the world are presented in graphic form and world economic maps are included.

PRINCIPLES OF GENETICS—Edmund W. Sinnott, L. C. Dunn and Theodosius Dobzhansky—*McGraw-Hill*, 5th ed., 459 p., illus., \$6.75. This revision of the standard senior-graduate textbook puts increased emphasis on biochemical aspects and on the genetics of micro-organisms generally.

THE PSYCHIATRIC HOSPITAL AS A SMALL SOCIETY—William Caudill—*Harvard Univ. Press* for the Commonwealth Fund, 406 p., illus., \$6.50. A social anthropologist examines the attitudes of the different groups—patients, nurses, resident doctors, and staff physicians—of a psychiatric hospital in operation.

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UNIVERSITIES, COLLEGES, AND JUNIOR COLLEGES, 1957-58—Ray C. Maul, Project Director—Research Division, N.E.A., Nat. Educ. Assn., 55 p., \$1.

THE STORY OF EYES—S. Sutton-Vane—*Viking*, 221 p., illus. with drawings by Anthony Ravelli, \$3.50. For the layman the author here brings together the many provocative facts about vision, ranging from microscopic sea creatures to man in space.

THE STRENGTH TO MOVE A MOUNTAIN—W. Storts Lee—*Putnam*, 318 p., illus., \$5. The story of the building of the Panama Canal, which took 10 years of work and cost \$375,000,000 in days when labor was demanding 20-30 cents an hour.

STUDIES ON FOSSIL VERTEBRATES—T. Stanley Westoll, Ed.—*Essential Books*, 263 p., illus., \$5.60. A volume of essays in honor of the great British vertebrate paleontologist, D.M.S. Watson.

TECHNOLOGY OF INSTRUMENTATION—Eric B. Pearson—*Van Nostrand*, 202 p., illus., \$4.75. An introductory textbook on the theory and practice involved in the instrumentation of measurement, control and computing processes.

THE VOCABULARY OF DENTISTRY AND ORAL SCIENCE: A Manual for the Study of Dental Nomenclature—George B. Denton—*Am. Dental Assn.*, 207 p., \$4. Since 1877 the A.D.A. has concerned itself with dental nomenclature. This book is a study of the principles of nomenclature applied to the problems of dental terminology.

WHAT'S GOING ON IN SPACE? A Chronicle of Man's Exploration into Space beyond this Earth—David C. Holmes—*Funk*, 256 p., illus., \$3.95. A U. S. Navy Commander reports on the events and the people engaged in pushing outward into space.

YOU CAN REDUCE: A Practical Plan for Controlling Weight Safely and Comfortably—*National Live Stock and Meat Board*, 30 p., illus., paper, single copies free upon request direct to publisher, 407 S. Dearborn St., Chicago 5, Ill. Eating meat is part of the dieting plan. The American Medical Association checked the statements for accuracy.

Science News Letter, June 21, 1958

PHYSIOLOGY

Brain Waves Measure Depth of Natural Sleep

► SCIENTISTS can now tell just how soundly a person is sleeping at any time all during the night.

This information is obtained by a continuous measurement of brain waves, those electric signals tapped directly from the brain itself. As a person drifts off from wakefulness to the deepest sleep, the record of brain waves shows a gradually diminishing number of peaks of amplitude.

The record can be obtained without waking or disturbing the sleeper, Dr. David Lester of the Yale Laboratory of Applied Biodynamics reports to *Science* (June 6).

The brain wave record shows for any moment during the night whether the sleeper was awake, in a drowsy state or in light, moderate or deep sleep. This record of the depth of natural sleep will be useful in research on the factors that lead to deep or disturbed sleep.

Dr. Lester checked the method by comparing the depth of sleep as shown by the record with the judgments of three judges, based on examination of the record.

Science News Letter, June 21, 1958

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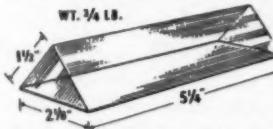


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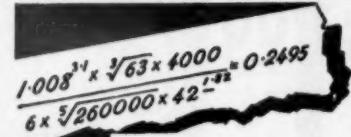
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MISCELLANEOUS

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ROCKETS AND MISSILES

Predict "Moon" Recovery

► RECOVERY of cargo-carrying earth satellites is possible, using presently available equipment.

It would be "most desirable" for such a satellite to land on water rather than on land. This is because the vehicle could be more easily found, Richard Hoglund and Dr. J. Thale of Cook Research Laboratories, Morton Grove, Ill., reported to the American Rocket Society meeting in Los Angeles.

Their study of a recoverable satellite is based on using a space vehicle with a spherical nose of five-foot radius and a total weight at re-entry of 1,250 pounds. The figures were chosen as representative, not as indicating the heaviest weight or largest dimension.

The scientists divided the recovery procedure into three parts:

1. Passage from a high-altitude orbit to an altitude at which effects of the earth's atmosphere become important, about 60 miles above the surface,

2. Re-entry through the atmosphere and descent to an altitude at which final recovery may be initiated, and

3. Final deceleration to conditions suitable for water or land impact.

Transferring the satellite from its high-altitude orbit to a lower one could best be accomplished by applying thrust in a direction opposite that of the vehicle's motion, the scientists reported.

The most difficult problems, they found,

Do You Know?

One of the most remarkable adaptations of life in nature is the wasp whose eggs are laid inside bodies of other insects, and which spends all its larval life feeding on fats and body fluids of the host.

Administration of vitamins during the early months of pregnancy may reduce the number of children born with a hare lip and cleft palate deformity.

Impulses from the brain influence what the auditory nerve picks up, thus allowing persons to hear only what they want to hear.

The Kodiak Island refuge in Alaska is a sanctuary for the huge Alaskan brown bear and other wildlife.

Skin rashes from rings result from a reaction between metal and salt on the skin rather than from too much acid in the body.

Oysters are unable to feed in water containing less than one-seventh as much salt as found in ocean water.

Argon, the most abundant of the rare gases, makes up almost one percent of the atmosphere.

are associated with re-entry through the atmosphere, but these can be lessened by using drag or lifting devices and by other means. Large parachutes, made of glass fibers or some other heat-resistant material, would slow the satellite sufficiently. Another parachute would be used to decelerate the satellite to a velocity suitable for land or water impact in the final stages.

Science News Letter, June 21, 1958

BIOLOGY

Giant Plastic Model Shows Cell Structure

See Front Cover

► A GIANT plastic dome, 25 feet across and 12 feet high, representing an "average" animal cell was exhibited at the American Medical Association meeting in San Francisco by The Upjohn Company, Kalamazoo, Mich.

The model, shown in the photograph on this week's cover of the SCIENCE NEWS LETTER, is approximately 1,000,000 times the size of an average cell.

The nucleus in the center is eight feet in diameter and contains a nucleolus made up of small red balls that represent ribonucleoprotein (RNP). The twisted strands represent chromosomes. Since the cell is in a resting stage the chromosomes are swollen, almost filling the nucleus.

The sputnik-like structure above and to the right of the nucleus is a centrosphere containing a pair of centrioles; the radiations represent the aster.

The long, interconnected capsules going up like an irregular ladder at the left of the centrosphere are flattened elements of the endoplasmic reticulum. These tiny canals are probably responsible for circulating raw products and finished materials in the cell.

The plastic tubes that form the shell of the model represent submicroscopic fibrils of the cytoplasmic matrix. They are larger than scale in order to support the structure.

Science News Letter, June 21, 1958

Questions

ASTRONOMY — How high do astronomers plan to send a manned balloon in order to take pictures of the stars? p. 392.

MEDICINE — What two viruses have been found to cause paralytic disease? p. 389.

PSYCHIATRY — What effect did the use of anaesthetics, as a substitute for electroshock treatments, have on some mentally ill persons? p. 388.

Photographs: Cover, The Upjohn Company-Ezra Stoller; p. 387, U. S. Army; p. 389, General Electric Company; p. 391, Bell Telephone Laboratories; p. 395, Ohio State University; p. 400, Thatcher Glass Mfg. Co., Inc.

Encouraging Science Talent . . .



THE NATIONAL SCIENCE YOUTH PROGRAM

The Science Service National Science Youth Program, dedicated to the development of science talent among youth, in operation since 1941, is effective, widespread and resultful in acquainting youth with science and technology.

About 487,000 boys and girls in junior and senior secondary schools participate in 19,500 science clubs affiliated, at no cost, with Science Clubs of America, sponsored by Science Service. With the basic material furnished, these groups conduct, inspire and encourage science experiment and experience predominantly through the six golden years of pre-college education.

There are each March or April, science fairs organized through encouragement and distribution of "know-how" by Science Service. Science fairs were held in 1958 in about 150 areas in the nation. Some 470,000 youths annually show their science and technology exhibits and projects in the fairs and in the preliminary fairs held in high schools. As top awards, contestants in local and regional fairs are sent to the National Science Fair, conducted by Science Service in a different city each May. More than 325 students will attend the 10th National Science Fair in Hartford, Connecticut, May 6, 7, 8, 9, 1959.

Science fairs are conducted by local organizations that enlist participation of school systems, colleges, industries, newspapers, service clubs, museums, etc. This is a "grass-roots" operation which reaches youth with directness. Good teachers espouse and encourage it. All the science factors in a community can cooperate. The hope

is that there will be a science fair available to every interested student. Now, well over a half of the nation is covered geographically. State academies of science and other science groups are taking leadership in the movement, cooperating with Science Service.

The annual Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted by Science Service, the 18th of which is now in progress, selects from all the high school seniors of continental United States, those whose scientific skill, talent and ability indicate a potential creative originality.

The Science Talent Search is the pioneering demonstration that successful scientists of the future can be spotted at the high school level. Studies of 40 winners and 260 honorable mentions chosen each year show that they fulfill magnificently their expectations, more than half going on to doctoral degrees. Entrants in 32 states have the opportunity of further recognition in State Searches.

Experimental kits (THINGS of science, etc.), magazines (SCIENCE NEWS LETTER and CHEMISTRY), services to newspapers, radio programs, etc., are Science Service activities that support and implement the science youth program.

Additional participation in this national science youth program, at national and local levels, will augment the future supply of scientists and engineers.

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❶ SAFETY HORN designed for use during cleaning operations in dangerous areas or with hazardous equipment is portable and non-electric. Persons entering confined or dangerous vapor areas manually set a timing mechanism. In the event of incapacitation there is an automatic gas-charged release for the alarm.

Science News Letter, June 21, 1958

❷ WRAP-AROUND TOWEL stays put with snap fasteners after the bath or shower. The towel, available in four solid colors, is designed for beach wear too. A series of snap fasteners at regular intervals around the waist allows adjustment for all sizes.

Science News Letter, June 21, 1958

❸ COMBINATION PICNIC PACKAGE consists of a portable food and beverage cooler plus a robe in its own zippered case. The encased robe snaps on-and-off the ice cooler and can be used as a cushioned seat, pillow or robe. The weight of the combined cooler and case is six pounds.

Science News Letter, June 21, 1958

❹ CASSEROLES of milk-white glass are held in woven metal serving frames that look like baskets. The casseroles, one of which is shown in the photograph, offer



oven-to-table convenience. They are available in different sizes and the frames in three colors.

Science News Letter, June 21, 1958

❺ NOISE PROTECTOR is an ear-muff type headgear with comfort added by liquid-filled vinyl plastic cushions. The sound

barriers, which can be worn over glasses or safety spectacles, are shaped, thermo-setting malamine cups. The headgear is available with earphones and attachments for connection to electrical communications systems.

Science News Letter, June 21, 1958

❻ EQUIPMENT AND UTILITY TRAILER has a capacity of 1,000 pounds. A self-locking winch operates a cable mechanism that lowers the trailer's bed to the ground for easy loading. The elevator-type trailer is designed for station wagons, light trucks and automobiles.

Science News Letter, June 21, 1958

❼ BABY CARRIAGE can be taken apart or re-assembled in a matter of minutes. Designed for easy storage at home or in the trunk of a car, the carriage is a British development.

Science News Letter, June 21, 1958

❽ PORTABLE RADIO KIT, featuring five transistors, comes complete with all parts. It is estimated the assembled radio will provide up to 200 hours of playing time from a single, nine-volt battery. Weighing 22 ounces, the radio is 3½ inches high, 7½ inches wide and 1¼ inches deep.

Science News Letter, June 21, 1958



Nature Ramblings



By HORACE LOFTIN

► IMAGINE, if you will, making plans for a tremendous fishing contest. Perhaps all the kids in a scout jamboree are going to try their luck with hook and pole. This would take a lot of worms for bait.

A generous farmer may say you can have all the earthworms you can dig up on an acre of well-drained, fertile soil. With this streak of luck, you organize the scouts and have them systematically turn over every square foot of the soil to a depth of one foot.

Will they come back to camp with hundreds of earthworms? Thousands of earthworms?

If they remove every earthworm in an acre of rich soil, they will have millions of them! And, according to U. S. Department of Agriculture figures, the total weight of all these earthworms in favorable soil would be close to half a ton!

Earthworms are fine for fishing, but they perform a greater service to mankind. The

Farmer's Friend



countless holes they dig through the soil, their transport of earth from one level to another, their "cementing" together of soil particles, all act to produce a well-aerated, well-drained soil for the farmer and forester.

It has been estimated that the earthworms in an acre of good ground can bring to the surface as much as 20 tons of buried soil a year. This means that they play an important role in the vital mixing of organic

material near the surface with underlying soil particles in the maintenance of productive soils.

Good soil "structure," or the clumping of soil particles into minute units, is important to the farmer, since this is vital to good aeration, drainage and root growth. The earthworms actually eat their way through the soil, absorbing food materials from the dirt they take in and passing out the residue in little clumps or "casts." These casts, held together by mucus, act directly in creating good soil structure.

Earthworms live best in properly drained soils containing plenty of organic material, available calcium and low acidity. When these conditions are not met, the numbers of earthworms dwindle.

Thus, the presence of a healthy crop of earthworms tells a farmer two things: that he already has a soil which is in good condition, and that the quality of his soil is being constantly improved by these underground friends.

Science News Letter, June 21, 1958

